Moving Pictures, Living Machines

*Automation, Animation
and the Imitation of Life in Cinema
and Media*

a cura di/*edited by*
Greta Plaitano
Simone Venturini
Paolo Villa

FilmForum/2019

XXVI Convegno Internazionale
di Studi sul Cinema
XXVI International
Film and Media Studies Conference

Dipartimento di Studi umanistici e
del patrimonio culturale
Università degli Studi di Udine
DAMS/IMACS

Mimesis

sommario/*contents*

Greta Plaitano, Simone Venturini, Paolo Villa
Università degli Studi di Udine

Imitation of Life:
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We have come a long way

At the end of a decade that saw an exponential, almost vertiginous development in Artificial Intelligence (AI), robotics, big data analysis, computer vision, algorithms, machine learning and virtual networks, in new and sometimes even unpredictable directions, the 2019 "Udine" Film and Media Studies Conference *Moving Pictures, Living Machines: Automation, Animation and the Imitation of Life in Cinema and Media* set its focus on the themes of automation and technology in cinema and the media.[1] The ever-increasing scale and relevance of automation processes and technological changes currently at play in every field of human activities – including communication media, artistic practices, social media interaction, archival preservation and restoration – urges an in-depth exploration of the implications and repercussions of this momentous passage. We intend to do this from a privileged vantage point: after all, due to its technological and mediatic nature, since its very outset cinema has been a site of exploration and experimentation of automatic images, representations of machines, technological developments, human-machine interactions, new concepts of modern visions and artificial gazes.

The contributions presented at the conference and now gathered in this volume navigate the complex questions concerning the interrelationships between automation, representation and "viewing/listening dispositives"[2] from early to late modernity, up to postmodernity. They cover a wide range of problems, issues and periods: from early cinema and animation films of the 1920s and 30s to contemporary mediatic environments, screens, videogames, GIFs and their social, racial and gender implications; from medical images and surgery robots to colour restoration algorithms and automatic archival tools; from classical depictions of automatons to unsettling, haunted and seemingly alive devices and images; up to epistemological reflections on media temporality, machines' ways of vision and legibility, and the connection of archives with technological and digital innovation.

The three sections of the book look at this rich and multi-layered panorama from different perspectives. The first part focuses on image automation, starting with the notion of animation and motion capture to end up with virtual realities and computer-generated images, and their social impact. The second section explores the connections between the human body and its artificial protheses, substitutes or even doppelgängers: screens, robots, automatons and body-shaped cameras. The third segment combines reflections on media temporality and the life-like quality of automatic images with the question of their survival and (digital) "afterlife" in the archives. However, some key ideas can be found in all three sections, acting as *fils rouges* that the reader can follow as traces of a single, ongoing dialogue across all of the papers. The agency of images and machines is a relevant topic that runs through the entire book; the problematic exchanges between human and artificial intelligence, or between human bodies and automatic tools and protheses, are discussed in numerous papers,

while many authors deal in different ways with issues of technophobia. A posthuman, transhumanistic perspective, which postulates and problematizes an (already accomplished) irreversible interconnection between human and machine, constitutes the theoretical background to several contributions. Given these multiple points of contact between the essays, we have therefore imagined the tripartition of the book not as a fixed, rigid scheme, but rather as a porous, osmotic structure that allows and invites the readers to connect the dots and create their own personal map to navigate this panorama.

Images of automation and automatic images: from animation to virtual environments

In the first and broadest section, the contributions – which investigate the complex topic of the XXVI edition of the Film Forum Conference – deal with the ambiguity implied by the very notion of automation and its representation.
The topic of images of automation implies a problematization exploring the different variables that revolve around the idea of life, the processes that are at its core, its representation and its communication and transmission – if and when possible. This therefore entails a heterogeneous investigation, on the one hand capable of examining processes, techniques and the functioning of single apparatuses and technological and virtual devices. But, on the other, it also entails an in-depth analysis, which must be able to link the latter with a tradition that sees the representation of life as the result of complicated re-mediations which cross through art history and aesthetics – long before the history of cinema and the modern media.
In this respect, the "1900 episteme" (which is the main feature of the "technical society that came into being in the 17th century and became the flourishing industrial society of the 19th century") and the "spectator(/or user)-machine-representation" tripartition are dealt with in an intersecting manner, spanning a period of time which runs from 1830 ca. to the contemporary world.[3] The representations of life and of the synergetic bond with the surrounding world and its techno-industrial transformation move from the history of pre-cinema devices of the 19th century and early cinema, through 1930s animations, to AI (artificial intelligence) and the experiences of VR (virtual reality).
More than a univocal *topos*, automation and its images can be thought of as a set of configurations in which the agency of men, machines and space meet in a historiography that includes not only the history of cinema and media, but also that of technique and of the milieu in which it develops. Technological progress and its representation are then structured in a series of motion captures in which humanity and devices meet and overlap, bringing to light tensions and historical-cultural problems of a specific moment in history and its imagery.
Specifically, the section opens with the emblematic essay by Horsman, which poses two central questions: "What are the relations between *cinema*, *animation* and *automation*? How do we understand the links between these three different ways of *capturing* motion, and three different technologies of *causing* motion, and evoking an illusion of life, or a feeling of *liveliness*?"
Starting from these questions, two counterposed tendencies – which appear throughout the volume – can be discerned. On the one hand, the representations through images of an utter confidence in technological progress, in which human life and mechanical process intertwine in an ecstatic movement; on the other, the aversion for progress that distances human beings from their true essence and from the real world, ostracizing and enslaving them. Thus technology, mechanics and velocity carry a dual iconography, in which the movement of the human body is fragmented in a series of repetitive gestures, "des comportements humains stéréotypés" (Charroppin), that lead the spectator towards a self-observation – grotesque, but also more aware of the changes which surround him or her.
Optical devices, games and cinema of attraction subsequently allow a consideration to be framed that revolves around the modern world and its dominion, through the "métaphore poussée du geste colonial" (Amy de la Bretèque), which discloses the conflicting narrations of a nature that is partly still savage and uncontaminated, and partly mutating towards a more and more militarized Western hegemony.
Yet, animation and automation also reveal the paradoxes and oxymorons of natural and artificial human life,

"des hybrides qui réunissent le réel et l'irréel, la succession et la simultanéité, l'arrêt et le mouvement" (Bertolini), allowing an analysis of those ambiguous processes of *remediation* that work in the different artistic and media fields, originating from a *tableaux vivant*, an animation (Rebecchi) or an experimental movie (Spampinato, for instance).[4] But the reproduction of vitality and its crucial moments goes beyond modern aesthetics. It opens up new reflections on the contemporary world, starting from some devices that explore the fields of AI, virtual and augmented reality (like in the essays by Campanini, Grossi and Girina), and communication (like the language and agency of GIFs, in the essay by Jung). These latter reflections therefore show the intricate variables that mark this topic, linked not only to the iconographic-visual imagery, but also and primarily to moral and political values (even verging on gender issues, like in the essay by Virgili), taking part in the construction of new apologies in which communication, technology and power merge into one another.

The body-machine symbiosis: screens, automatons, prosthetic technologies

The tradition of comparing the human body to a machine or a mechanical artefact dates back to ancient times and appears throughout the history of Western thinking. The ideas of "mechanical bodies" and "organic machines," largely widespread since the 18th century, found support in scientific discourses promoting a rationalized and deterministic approach to medicine and biology, as well as in the ever-growing presence of automation in everyday life, as brilliantly pointed out in Sigfried Giedion's landmark book *Mechanization Takes Command*.[5] Today this body-machine relationship, also due to current digital technologies, has become so close and mutual to be more accurately described as *symbiosis* rather than simple coexistence or reciprocal assistance. The use of machines and devices as tools, extensions, protheses or improvements for physical and productive activities has reached such a pervasive level that it is sometimes unclear who uses whom, the machine or the human. The symbiotic relationship between body and machine is in fact always bidirectional, and as much as we anthropomorphize machines, we also absorb machinic features into ourselves, modifying the ways in which we look at, think of and relate to our bodies. As Daniel Black explains, we have been projecting human characteristics onto instruments, tools and technological artefacts for centuries, in order to render their capacity for self-generated action more familiar and comprehensible. However, we are less aware of the fact that we also introject machinic attributes and incorporate the agency of the machines into our embodied experience so that we can successfully relate to and interact with them. In so doing we explore and create models to understand "our own embodied selfhood."[6]

Cinema and media have always been very attentive to (and attracted by) the body-machine connection. Screens have always been its essential surface and interface of negotiation, whether they epitomize the will for dematerialization of the human body and the rise of an aesthetic of total transparency, as explained in Bodini's essay, or rather become a strategic tool for machines and AI systems to connect with reality and gain agency and a tangible body, as Dalmasso points out: "screens seem to free us from the ties of our bodies, but, at the same time, they can have the effect of isolating us," thus remarking the limits of our bodily experience of reality but also the role of the body as the first screen, our primordial sensorial – in this sense, properly aesthetic – surface of connection and interaction with the external world.

Cameras, photography and films have always played a crucial role in scientifically representing the body as a mechanical structure to study, dissect and reproduce, while at the same time creating a new gaze towards it. Lisa Cartwright has argued that, throughout the 20th century, the motion picture was in fact "a crucial instrument" in the process of building, from a practical but also an epistemological perspective, specific modes of representation connected to science, medicine and the public discourses around these disciplines in Western countries. This specific gaze construction reconfigured our vision and understanding of (human) bodies as "dynamic fields of action in need of regulation and control."[7] Moving pictures and scientific images, almost always associated with technological instruments and data elaboration procedures, have become more and more important in recent decades and continue to be a fundamental factor in medicine and science today. As every visual culture scholar or specialist knows, the universe of non-artistic images, of which scientific

and medical ones are an essential category, deserve our full attention after being ignored for too long.[8] This modern, medical gaze is the core of David and Dolores Steinman's contribution, which explores the role of animated-automated images and of new systems of data representation in medical laboratories – thus building a bridge between medical research and visual studies and metaphorically connecting some milestones in cinema history (Marey's and Muybridge's studies on movement representation, early cinema, the introduction of sound) with specific iconographic strategies of scientific and medical representation. Lammer's essay, which connects anthropology and media studies with on-site documentary practices that explore human-machine surgery, not only reflect on the issue of the body's surface and viscera, but also on touch: eyes become hands, sight intermingles with touch in some medical short films she analyses and in the highly technological surgery procedures she documents in her own activity as a filmmaker at the General Hospital in Vienna.

If the body has long been paralleled with the machine, then automatons, robots, mannequins and mechanic puppets have always held a strong and haunting fascination for artists and thinkers, generating a variety of images, narratives and reflections. Martin and Le Maître's contributions constitute a diptych dedicated to the famous avant-garde animation film *Street of Crocodiles* by the Quay Brothers (1986). Martin pinpoints the notions of body simulacra and flesh as medium, presenting a new facet of how animation is related to the idea of life: as she highlights, "*Street of Crocodiles* invites us to interrogate the concepts of life and the living modelled by the scientific (mostly philosophical) and fictional representations." This leads to an in-depth examination of Quay's film in relation to other animated films, in order to reflect upon the concept of *anima* and what it means for a body to be "animated." Le Maître brilliantly connects the film to Duchamp's *La Mariée mise à nu par ses célibataires, même*. She recalls the idea of the *machine célibataire*, a central trope of Duchamp's oeuvre that provides a new, articulated reading of *Street of Crocodiles*, whose connections with this famous avant-garde work of art reveal a large common cultural ground throughout the 20th century which considers human bodies and human-like machines not only as similar, but interchangeable. This unsettling relationship between men and automatons is examined more widely in Pierre's contribution: again recalling Duchamp's *machine célibataire* as a starting point, he explores the long and meaningful presence of automatons in cinematic fictional narratives, highlighting their function as the haunting, uncanny double or doppelgänger of the human onto which it is possible to project issues, worries or fantasies regarding social control, sexuality and gender roles or procreation concerns – in wider terms, as socio-cultural and political metaphors.

The last four essays of this section reflect upon technology and the relationship with its users, stemming from the TECHNÈS International Research Partnership and the University of Rennes ANR BEAUVIATECH Research Program. The BEAUVIATECH Program aims to investigate the legacy of the Aaton company and its founder Jean-Pierre Beauviala, a key figure in conceiving, designing and producing cameras in the second half of the last century: in so doing, the project sets out to interrelate technology, creativity and cinema patrimonialization in the light of aesthetics, media archaeology and socio-cultural studies. As Mouëllic and Massuet write in their introduction, the digital transition in media and a sort of "hybridism" between digital and analogue practices have induced changes in cinematographic techniques on a practical as well as a theoretical level, including the reconfiguration of the notion of body in relation to new technologies: a field of inquiry that remains relatively unexplored, but surely deserves full attention: "This hybridism is at the basis of the complex reflections on this transition that can be examined from practical, sociological, economic and aesthetic angles which share the common feature of directly arising from technical considerations." Within this shared methodological frame, the following three essays investigate the connection of the camera to the body of the user: the body-capture technique and recreation of the actors' features, figures and movements in synthetic, virtual images, with all the theoretical implications this may involve is the topic of Massuet's paper; Daniellou analyses the mutual adaptation of eyes and hands, postures and gestures to the camera and vice versa, from a practical as well as a conceptual point of view, wondering if it is the camera that is anthropomorphized or rather the body that becomes more and more mechanized; Thouvenel's contribution highlights the contrast between the industrial, standardized production of cameras and the struggle to make each of them (body-) specific to its user: the perspective of the camera as a unique, personal extension of the self, a technological prothesis able to reconfigure our place in reality which recalls and expands in some ways Dziga Vertov's ideas

on *Kinoglaz*. A single, significant case thus elicits questions and insights on representation, interconnection and the interdependency between human bodies, technological forms and developments, aesthetic figures and mediatic practices.

Technological vitalism: the liveliness of medias and their (after)lives in the archives

A first idea shared by many of the contributors in the third section is that technological *vitalism* displays a deep *economic* nature in the process of redefining concepts such as temporality, life, memory, labour and power.
As argued by Ernst, temporal smearing "is more than just an anthropocentric, phenomenological retro-action to comfort traditional notions of temporality, [it is] its redefinition in terms of temporal economy." Within this temporal economy, concepts such as life, end-of-life, death and after-life (see for example the "time-to-live" and "ping-to-death" Internet temporalities discussed by Ernst) are framed in an unprecedented time management and disciplinary system. In other words, through the techno-mathematical mediatization of time exerted by the computational networks and protocols, temporality is stretched and filled by unperceivable calculated errors and hiatuses. Furthermore, it is inserted in a different order of sovereignty instead of being part of the symbolic and pragmatic order of the traditional time authorities: "calculating time [has] turned out to be a technical historicity from now on – a temporality to which human concepts of time are increasingly subjected."
Positioning the concepts of time and temporality in the concrete order of operational processes invites a historical comprehension of their epistemic nature, roots and genealogy. In this way, both Ernst and Lundemo refer to the pioneers of cybernetic thought (such as Wiener, von Neumann, etc.) and to the specific embodiment of time and "revision of the concept of life" introduced by cinematic media at the turn of the 20th century. Lundemo traces the contemporary interest in the "renegotiation of the question of life" back to the early cybernetic period, and he is primarily interested in understanding the current "state of life between analytic inscription and synthesis." Within these time-critical processes, the suspension of life and resuscitation of the past embodied and fostered by the film archive do not only experience a change in the ontology of archival objects but a wider renegotiation of the current authority on the (suspended) archival life of films. Within this perspective, engagement with a different temporal economy reframes the human- and discourse-centred concept of the archive, and the long-standing debate over preservation (the transmission chains) and access (the communication networks) in the field of film heritage institutions can be interpreted as a multi-layered and mediatized struggle around concepts such as life and time. In bio-political terms, this suspended status and the extension of time sovereignty introduced by time criticalities bring the current media landscape and agencies closer to the "*Muselmann*'s 'third realm'" pinpointed by Agamben in the wake of the German sociologist Sofsky, where "life and death continuously pass through each other."[9] Such an *in-between* economy does not exclusively belong to the archival realm but is more and more intertwined and co-built with the post-production and machine-learning operational environments.
The unstable state of our archival infrastructures and contemporary images is well depicted by the contributions of Petry and Tongiani. Traditionally the archive is considered a regulated apparatus and repository of memory and knowledge where people, communities and societies can hold and retrieve traces and documents concerning past events and everyday lives. However, Petry displays the "cloudy" state of the relationships between photography, memory and archival sorting. In so doing, he clearly depicts how the operative and cognitive functions of commanding, learning, recognizing, ordering and telling are only superficially addressed to preserving and organizing personal visual memories. Rather than an answer to the digital fragility and overabundance of data, the archival management of these memories displays a deep connection with the unprecedented cognitive and economic order embodied by learning machines and global companies.
Starting from a radically different set of case studies (the experimental works and experiences of Widrich and Brambilla), Tongiani devotes her contribution to the artistic attempts to theoretically and practically "thinker" two archetypical practices of reshaping the cinema's (living) body: animation and found footage. As Tongiani

writes, "the core of these works consists both of pre-existing films, found footage, and animation." Linking together a set of analogue and digital techniques, both artistic practices reflect "the perpetual state of becoming of contemporary images," and offer powerful and enlightening allegorical representations of the generative models and their neural network architectures.

Previtali, in turn, focuses his contribution on the uncanny and scary "vital quality of images." By initially tracing the historical background of the "haunted media," he then discusses some current phenomenological occurrences related to Steyerl's reflection on Snowden's files and more closely on sub-genres such as "screen-cast horrors." Previtali's reflection highlights "a sort of techno-fetishism that seems to cross the discourses and the practices connected with contemporary phenomena [such as] algorithms and the emergence of a form of artificial thinking that is more and more complex and autonomous." Entering a non-human ontology of images calls into question what Denson recently defined as the "discorrelations" of moving images "from human embodied subjectivities and (phenomenological, narrative, and visual) perspectives," all of which challenges socio-economic identities and the affective dimension.[10]

Carlsson, in his contribution on the "visual representation of automation," focuses his attention on an eccentric textual case study (the meta-discursive art-house *Arrebato*, a prominent, low-budget cult film of the Spanish new wave of the late 1970s), leading the temporal economy described above into a narrower economic perspective. In his textual analysis, the symbolic and political economy of cinema depicted by Zulueta's film and the concept of "cinema as life" are framed as "a visual schematization of the temporality of debt." Following Goodchild's theology of money, Carlsson takes up the idea that money possesses "a value that does not exist out of its recording." The monetary economy and exchange value become related to a temporal contract with cinema conceived as a temporal and scopic economy of debt suspended between stillness and motion. The filmic/monetary analysis-synthesis circuit generates a sort of *proletarization* that, as Carlsson argues in his conclusion, cannot "fully envelop human time; precariously dammed up, [the] relation always keeps bleeding into new forms."

This openness reverberates into Lombar's analysis of the film heritage field based on Stiegler's visions of labour, which lead us to understand how in the post-cinematic scenario the *energeia* no longer seems to be embodied by the human being or human labour, but is instead displaced in specific forms of exteriorization (tertiary retention).

The issues briefly summarized and displayed thus far reveal a second thread and question which are spread implicitly among the contributions of the final section: the *legibility* of the image/machine and the fundamental role of the *humanities* in reducing the blind spots of automated representations and micro-temporal operational processes.

Adopting an epistemological perspective, Hesselberth, Houwen, Peeren and de Vos point out that "all legibility is historically, culturally and materially specific." Following Lazzarato (and Marx's "Fragment on Machines"), they observe how in the contemporary production of subjectivities and meanings, "the machine fundamentally disregards distinctions between subjects and objects, words and things, human and non-human operators," where the machine is framed as "the complex technological, intellectual and above all social assemblage that objectifies (and ultimately automates) all human skill, expertise and knowledge into the machine" itself, reducing the human to a "raw material of the machines of semio-capitalism." As has been pointed out in several quarters, nowadays critical theory and the humanities play a fundamental political and epistemic role in unmasking "what remains illegible in the machinic processes at work in our present-day culture and society."

The current shape of fixed capital objectivized and automatized in machines calls for economic and political therapies and the last contributions – focused on the film and audiovisual heritage and archival practices – appear in different ways to be addressed to *neo-humanistic*, *neganthropic* and *hands-on* approaches, able to stimulate and inspire individual and collective transindividuation imagination and thought processes.

Lombar, discussing projects such as Eye's *Jan Bot* and the BBC's *Made by Machine*, notes how "the digital turn has in fact expanded the preservation field to a larger labour force" where "archivists no longer handle their

own materials," they hand over the association with the epistemic, gestural and haptic qualities of "handling" to the "machinic labour of archival robots" and automation.

Noordegraaf, in turn, starting from the notion of "cultural memory," focuses her contribution "on the impact of digitization on the audiovisual archive" and on "the status of the archive's holdings as sources of remembering." In particular, "digitization concerns the role of automation in the process and practice of description" and "another consequence of automation is that the process of description now extends beyond the walls of the archival institution, involving the producers of the content, who now also are the principal creators of the descriptions." In her conclusions, Noordegraaf highlights how the interpretation of archives "becomes a collective responsibility of producers, archivists and users." Within this frame, *description* is one of the main places where the current media landscape and media studies field is engaging in a political struggle around the question of *legibility*, and the rise of new descriptive and meta-descriptive roles and functions such as "metadata curator" and "metadata manager" reminds us that "the activation of cultural memories by digital media objects also relies on the form in which we experience them" and the "evocations of the sensual qualities of tangible objects could help to sustain their power to trigger memories, in a future where we may primarily have access to them in digital form."

The search for a "humanistic method to investigate digital objects" is the key concept of Negri's contribution. Film prints are not just raw materials and sources for film restoration but also unique historical documents, marked by several clues that we can detect thanks to the evidential paradigm described by Ginzburg and introduced as an identification and descriptive method in archival practices in the late 1940s by Harold Brown.[11] Following a technocultural approach and looking for "'markers of uniqueness' in the digital world," Negri then comes to the digital forensic and humanistic and generative "forensic imagination"[12] which, applied to *read* the signs of the material traces left by the current computational media, makes it "possible to understand a deeper reality than would otherwise be attainable."[13]

Last, but not least, Rizzi and Plutino discuss and propose "the use of a specific family of unsupervised algorithms for image restoration inspired by the capabilities of Human Visual System (HVS)." The strict dependence of colour (as a perceptive phenomenon) on elaboration by HVS leads the researchers to be "faithful" to "appearance according to our vision system," instead of seeking to achieve an unattainable reconstruction of the original colour gamut of the films. Bringing into play Gombrich's "controversial" thought about restoration, the authors point out that "for our vision system, restoring the ratio and the appearance is more important than the fidelity to the original physical colour."

Even in this case, the central role attributed to human vision in the application of an automatic colour correction process may be interpreted as an attempt to balance, in a generative and collaborative way, the relationship between technology as a subject of history and the human being, otherwise reduced to a cog or in the best scenario to a "shepherd of objects."[14] If we are to also embrace a critical and "humanistic" approach in the field of the algorithms used in archival practices, often misunderstood as a mere *technical* system of tools and protocols, this can help unveil one of the most influential operational frameworks that feeds the blind spots of our fragile field of film and media studies.

Notes

1   This introduction was thought out and structured by the three authors together. For practical purposes, the section "We have come a long way" was written by the three authors; "Images of automation and automatic images: from animation to virtual environments" was written by Greta Plaitano; "The body-machine symbiosis: screens, automatons, prosthetic technologies" was written by Paolo Villa; while "Technological vitalism: the liveliness of medias and their (after)lives in the archives" is by Simone Venturini.

2   Maria Tortajada, François Albera (eds.), *Cinema Beyond Film. Media Epistemology in the Modern Era*, Amsterdam University Press, Amsterdam 2010.

3   *Idem*, p. 25.

4   Jay David Bolter, Richard Grusin, *Remediation. Understanding New Media*, MIT Press, Cambridge 1999.

5   Sigfried Giedion, *Mechanization Takes Command. A Contribution to Anonymous History*, Oxford University Press, Oxford 1948.

6   Daniel Black, *Embodiment and Mechanisation, Reciprocal Understandings of Body and Machine from the Renaissance to the Present*, Ashgate, Farnham 2014, p. 10.

7   Lisa Cartwright, *Screening the Body. Tracing Medicine's Visual Culture*, University of Minnesota Press, Minneapolis 1995, p. XI.

8   See James Elkins, "Art History and Images That Are Not Art," in *Art Bulletin*, vol. 77, no. 4, 1995, pp. 553-571.

9   Giorgio Agamben, *Remnants of Auschwitz. The Witness and the Archive*, Zone Books, New York 1999, p. 48.

10   Shane Denson, *Crazy Cameras, Discorrelated Images, and the Post-Perceptual Mediation of Post-Cinematic Affect*, in Shane Denson, Julia Leyda (eds.), *Post-Cinema. Theorizing 21st-Century Film*, Reframe Books, Falmer, East Sussex 2016, p. 193.

11   Harold Brown, *Physical Characteristics of Early Films as Aids to Identification*, FIAF, Brussels 1990 (see the forthcoming, 2020, "expanded" edition of Brown's classic edited by Camille Blot-Wellens).

12   Matthew G. Kirschenbaum, *Mechanisms. New Media and the Forensic Imagination*, MIT Press, Cambridge 2008.

13   Carlo Ginzburg, "Clues. Roots of a Scientific Paradigm," in *Theory and Society*, vol. 7, no. 3, May 1979, pp. 273-288, p. 280.

14   Günther Anders, *Die Antiquiertheit des Menschen 1. Über die Seele im Zeitalter der zweiten industriellen Revolution*, C.H. Beck, Munich 1956; Id., *Die Antiquiertheit des Menschen 2. Über die Zerstörung des Lebens im Zeitalter der dritten industriellen Revolution*, C.H. Beck, Munich 1980.